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THE MANUFACTURE OF MONTEREY CHEESE

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THE MANUFACTURE OF MONTEREY CHEESE

C. A. PHILLIPS[1]

During the past few years, the name 'Monterey' has gradually replaced that of 'Jack' on the markets, although 'Non-standard Jack' is now used for this type of cheese when it contains more than 42 per cent of moisture.

The California Dairy Law[2] defines Monterey cheese as that "made by the so-called stirred-curd or granular process, without added color, characteristic in size, and molded into characteristic shape or form in bags under pressure, and containing not more than forty-~~two~~ four per cent of moisture."

The early history of Monterey cheese is given by Baird[3] in these words:

> Jack cheese, sometimes known as Monterey cheese, originated in Monterey County, California. The first Jack cheese was made on a ranch twenty miles south of Monterey about 1892. The method grew out of a need for disposing of surplus milk at a small expense for equipment. The fact that it requires but little equipment makes it a practical method on farms where only a small amount of milk is available.
>
> Until about 1912 very little was known of this cheese outside of Monterey County. Practically all the cheese which was not sold locally was marketed through San Francisco wholesalers. Previous to the war practically all this cheese which was manufactured consisted of full-cream or 'table' Jack. Soon after the beginning of the war, however, the importation of grating cheese from Europe was cut off, and in order to take care of the trade on these types of cheese on the Pacific Coast, San Francisco wholesalers conceived the idea of replacing it with Jack cheese. Cheese makers were given instructions to make the Jack from half-skim milk and to ship it as soon as practicable (about one week old). The cheese was then dried and cured by the wholesaler.
>
> The grating cheese when properly made and cured proved to be a fair substitute for the imported brands and soon became popular on the Pacific Coast. Eastern buyers, learning of this cheese, made inquiry and asked for trial shipments, and the result was that large orders were placed with San Francisco distributors. Until this time, practically all the Jack cheese had been made by men experienced in the manufacture of this type of cheese, and a good product was being used to fill eastern orders. This large demand, however, was more than could be supplied by the factories manufacturing Jack cheese and a call was sent

[1] Assistant Dairy Technologist in the Experiment Station.

[2] California Dairy Laws and Regulations, effective July 29, 1927.

[3] Baird, H. S. Jack cheese. California Agr. Exp. Sta. Cir. 206:1–2. 1919. (Out of print.)

out to the dairies and creameries to turn their raw product into Jack cheese, offering, at the same time, very attractive quotations. The result of this was disastrous to California grating Jack cheese. Jack cheese factories sprang up in all parts of the state and many creameries made Jack cheese as a side line. A large portion of the new cheese was made from straight skim milk and naturally was lacking in quality. The market soon became over-supplied with an inferior and non-uniform product, and the failure of the distributors to fill their orders with a high-quality cheese soon destroyed the buyers' faith in Jack cheese.

During 1926, 99 per cent of the Monterey cheese in California was made in factories and 1 per cent on farms. Of the non-standard Jack cheese, however, only 71.8 per cent was manufactured in factories and 28.2 per cent on farms.

MILK FOR MONTEREY CHEESE

The milk for Monterey cheese should be of good quality, low in acidity, not exceeding 0.18 per cent, and free from gas-forming bacteria. It should have a good odor and flavor.

Sterilization of Utensils.—All utensils coming in contact with the milk should be thoroughly sterilized in boiling water for 15 minutes or in live steam in an enclosed container. Several suitable types of farm sterilizers are now on the market, and are available at a moderate price. Strainer cloths should not be used, since they often cause serious contamination. The proper procedure is to keep the dirt out of the milk; but if some gets in, it is better for the factory operators to remove by straining through equipment which can be readily and thoroughly sterilized. Factory experience in California has shown that the use of farm strainers that are not thoroughly sterilized often injures the quality of the milk.

Cooling the Milk.—A mixture of evening and morning milk is used. Both should be cooled to a temperature of about 60° Fahrenheit. Recent experiments[4] show that cheddar cheese scored one point higher when the milk was cooled before manufacture of the cheese. In addition to preventing rapid bacterial growth, it is probable that the aeration during cooling has a beneficial effect in removing abnormal flavors.

Satisfactory methods of cooling milk on the farm are described by Gamble.[5]

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[4] Marquardt, J. C., and G. J. Hucker. Effect of pasteurization and cooling of milk upon the quality of cheddar cheese. New York Agr. Exp. Sta. Bul. 534:3. 1926.

[5] Gamble, J. A. Cooling milk and cream on the farm. U. S. Dept. Agr., Farmers' Bul. 976:1–16. Revised 1923.

Pasteurizing the Milk.—Some difficulty has been encountered in producing milk suitable for the manufacture of Monterey cheese during the summer months, especially in the inland valleys of California. In these localities much of the milk is high in acidity and contains large numbers of bacteria, including the gas-forming types.

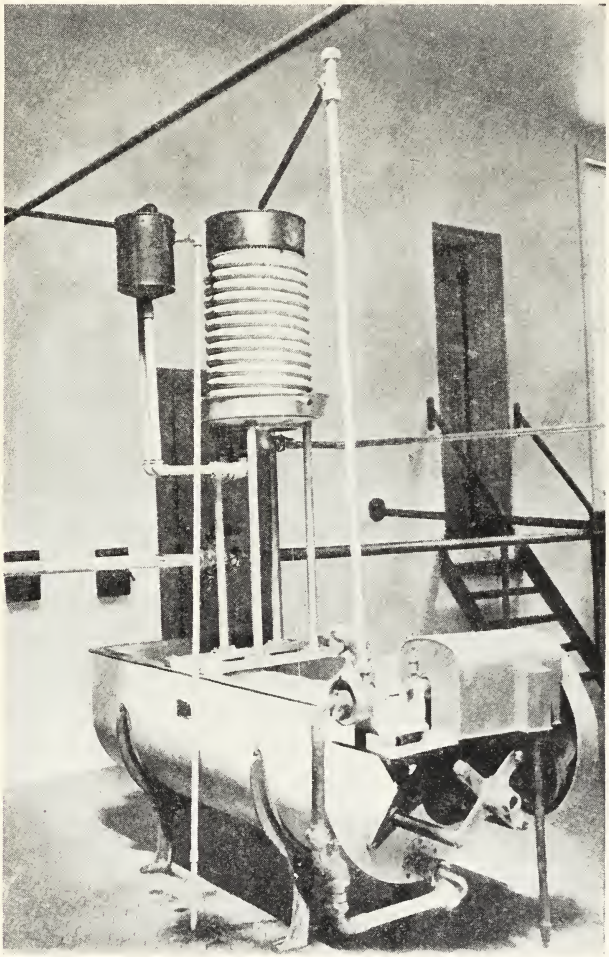


Fig. 1.—Device to warm the milk before it reaches the pasteurizer. This forewarmer is shown above the receiving vat.

Experiments conducted during the past two years at the California Agricultural Experiment Station[6] and at the New York Experiment Station[7] show that pasteurization of milk improves the quality of the

[6] Unpublished data.

[7] Price, W. V. The manufacture of cheddar cheese from pasteurized milk by the holder method. Cornell Agr. Exp. Sta. Memoir 105:1–36. 1927.

cheese, gives greater uniformity, increases the yield, and eliminates the gas-forming bacteria. Since July, 1926, the University Farm Creamery has used pasteurized milk in the manufacture of all Monterey cheese.

The vat method of pasteurization, that is, heating to 140° to 145° F and holding for 30 minutes, is suitable for limited production.

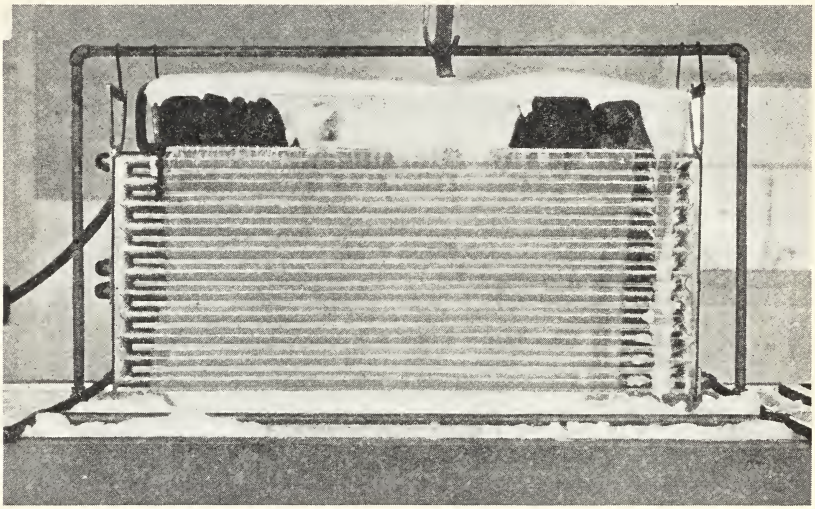


Fig. 2.—The surface cooler, over which the flash pasteurizer forces the milk after heating.

Manufacturers have not found this method practical for production on a large scale and use the flash method instead. Such a method is practiced at the University Farm Creamery. The milk flows by gravity from the weigh-can to the receiving vat, where it is pumped over a forewarmer (fig. 1) and heated to a temperature of 110° F. It then flows into the flash pasteurizer, where the temperature is automatically controlled. It is heated here to 165° F. Higher flash pasteurization temperatures have an undesirable effect on the flavor and texture, and as yet are not recommended.

The flash pasteurizer forces the milk through sanitary pipe lines and over a cooler which rests on top of the cheese vat (fig. 2), where it is cooled to 88° F for setting. The regenerative system of flash pasteurization is also recommended for factories producing cheese in large amounts. The foam which forms on top of the milk as a result of agitation should be raked off.

Standardizing the Milk.—According to the California Dairy Law, whole-milk cheese "shall contain not less than 50 per cent of pure

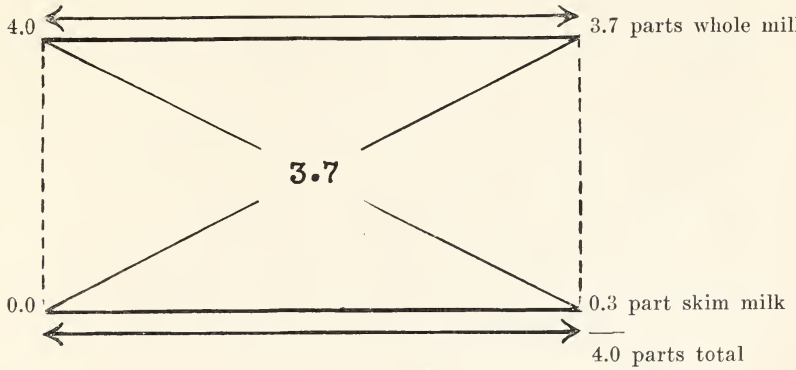
milk fat in its water-free substance." Heretofore it has usually contained more than this required amount. Since the quality of the cheese is not affected to any extent by the removal of a small amount of fat, many manufacturers have been standardizing for reasons of economy.

The percentage of butterfat that may be removed from the milk depends upon the original content of fat and solids-not-fat, as well as upon the methods used in making the cheese. Milk containing from 3.0 to 3.5 per cent fat should not be standardized; but 4.0 per cent milk may be standardized to 3.7 per cent, and 5.0 per cent milk to 4.5 per cent, without disturbing the proper relation between the fat and the water-free substance in the cheese. These reductions in fat content, however, are only approximate. Each manufacturer must use his own methods according to the analysis of his cheese.

Calculations in standardization may be made by the rectangular method, and the amounts of milk and skim milk may be given in pounds or gallons as follows:

Problem: Standardize 600 gallons of 4.0 per cent milk down to 3.7 per cent, using skim milk. How much skim milk should be used?

The tests of the milk and skim milk are placed at the left-hand corners of the rectangle, the test desired being placed in the center. Subtractions are made diagonally across the rectangle, the resulting figures being the parts of whole milk and skim milk to be used.



Calculating:

3.7 parts = 600 gallons
1.0 part = 600 ÷ 3.7 = 162.16 gallons
0.3 part = 0.3 × 162.16 = 48.6 gallons

Therefore, 48.6 gallons of skim milk may be added. When skim milk is not available, part of the whole milk is separated.

Problem:

Standardize 600 gallons of 4.0 per cent milk to 3.7 per cent by separating a portion of the milk and returning the skim milk to the vat. How much milk should be separated, if the cream tests 35 per cent butterfat?

Let G = number of gallons of milk given.

Let A = percentage of fat in given milk.

Let C = percentage of fat in cream.

Let B = percentage of fat in milk after adding the skim milk.

Let X = number of gallons to be separated.

Let M = amount of milk after returning the skim milk to the vat.

Then, $X = \frac{C\ (A - B)\ G}{A\ (C - B)}$

Also, $M = \frac{(C - A)\ G}{(C - B)}$

Then, for proof, $A\ (G - X) = BM$

$X = \frac{35\ (4 - 3.7)\ 600}{4\ (35 - 3.7)} = \frac{35 \times .3 \times 600}{4 \times 31.3} = 50.32$, number of gallons to be separated.

$M = \frac{(35 - 4)\ 600}{35 - 3.7} = \frac{31 \times 600}{31.3} = 594.2$ gallons of milk after adding skim milk.

Proving,

$4\ (600 - 50.32) = 3.7 \times 594.2$

$4 \times 549.68 = 3.7 \times 594.2$

$2198.72 = 2198.54$

(These figures will not check exactly when only one or two decimal places are used.)

For those who are not accustomed to working with algebraic formulas, the following rule is given:

A. Rule for finding the amount of milk to be separated.

Step 1. Subtract the percentage of fat wanted in the final milk (after adding back the skim) from the percentage of fat in the given milk and multiply the result by the percentage of fat in the cream, then multiply this result by the number of gallons of milk given.

Step 2. Subtract the percentage of fat wanted in the final milk from the percentage of fat in the cream, and multiply the result by the percentage of fat in the given milk.

Step 3. Divide the final result of step 1 by the final result of step 2. The result of this division will be the number of gallons of the given milk to be separated.

Example (using problem given above):

Step 1. $4 - 3.7 = 0.3$; $0.3 \times 35 = 10.5$; $10.5 \times 600 = 6300$.
Step 2. $35 - 3.7 = 31.3$; $4 \times 31.3 = 125.2$.
Step 3. $6300 \div 125.2 = 50.32$, number of gallons of milk to be separated.

B. Rule for finding *M*, the final amount of milk.

Step 1. Subtract the percentage of fat in the given milk from the percentage of fat in the cream and multiply the result by the amount of given milk.

Step 2. Subtract the percentage of fat wanted in the final milk from the percentage of fat in the cream.

Step 3. Divide the final result of step 1 by the result of step 2. This will be the number of gallons of final milk.

Example:

Step 1. $35 - 4 = 31$; $31 \times 600 = 18{,}600$.
Step 2. $35 - 3.7 = 31.3$.
Step 3. $18{,}600 \div 31.3 = 594.25$, the final amount of milk.

C. Rule for checking results.

Step 1. Subtract the amount of milk separated from the amount of given milk, and multiply the result by the percentage of fat in the given milk.

Step 2. Multiply the amount of final mlk by the percentage of fat wanted in it.

The results of steps 1 and 2 should be very nearly equal. Example:

Step 1. $600 - 50.32 = 549.68$; $4 \times 549.68 = 2198.72$.
Step 2. $3.7 \times 594.2 = 2198.54$.

Making the Starter.—Although a starter should be used, some manufacturers are making fairly uniform Monterey cheese without it; a poor starter, however, is worse than none. The culture, necessary for beginning the propagation of the mother starter, may be obtained from any one of several reliable laboratories. Both liquid and powder cultures are on the market; either may be used successfully.

Several clean, sterile quart bottles are filled about three-fourths full of fresh clean whole or skim milk, preferably pasteurized. These are heated in a water bath to a temperature of from 180° to 190° F for one hour or more, or in an autoclave under 15 pounds steam pressure for 20 or 30 minutes, and then cooled to 80° F. They should be inoculated with the culture at this temperature late in the afternoon, and incubated overnight at the inoculation temperature. An electric incubator may be purchased, or a wooden box, electrically wired and containing a rheostat and electric light, may be constructed. Some cheese makers set the bottles near the boiler, or in a warm room, but this is not reliable, since the temperature may change. In case this procedure is necessary, the bottles should be placed in a water bath at the incubation temperature.

A smooth coagulation should be obtained by the following morning. The bottles should then be placed in a cold room at a temperature below 40° F or in an ice box until used. The mother starter is carried forward the second and succeeding days, the same procedure being followed, except inoculations are made from a small amount of the mother starter made the previous day, and incubations are made at a temperature of 70° F.

The quantity of milk needed for the bulk starter is selected and pasteurized in a starter can, or in ten-gallon cans at a temperature of 180° or 190° F for one hour. It is then cooled to 70° F and inoculated with the mother starter. The amount necessary depends on the strength of the mother starter, the temperature of incubation, and the initial acidity of the milk. When the milk is held at a constant temperature of 70° F., about 1.0 per cent of starter will be required. The starter should have a clean acid flavor, with 0.65 to 0.90 per cent acidity, be free from objectionable gas formation, show no whey separation on top, and be smooth and creamy after thorough agitation.

WHOLE-MILK MONTEREY CHEESE

The equipment in a cheddar-cheese factory may be used in the manufacture of Monterey cheese, except that vertical presses and cloths instead of metal hoops should be used in pressing the cheese.

Adding the Starter and Rennet (Setting).—From 0.5 to 1.0 per cent of starter is added to the milk. However, if the acidity of the milk is above 0.18 per cent, only 0.25 per cent should be added. An amount of rennet sufficient to coagulate the milk in 25 to 35 minutes should be added at 86° F to raw milk or at 88° F to pasteurized milk. The amount of rennet will vary inversely with the acidity of the milk and the strength of the rennet. Under average conditions, from four to six ounces of the better quality of commercial rennet for each 1000 pounds of milk will be required. Rennet should be measured accurately in a clean glass cylinder, graduated in ounces or cubic centimeters (one ounce equals 30 cc.), and should be diluted to about 20 times its volume with pure cold water.

The diluted rennet is added to the milk, being distributed from one end of the vat to the other. The milk is then agitated vigorously for two or three minutes until the rennet is thoroughly distributed. After this agitation, the milk in the gate valve should be drawn off and poured into the vat. The milk should be quieted by pressing a pail into the surface in the center of the vat. After the milk is quiet, the

vat should be covered with a cloth or canvas in order that the temperature of the milk may remain as nearly uniform as possible (fig. 3).

Cutting the Curd.—The firmness of the curd may be tested by inserting the index finger or a floating thermometer into the curd diagonally, then raising it slowly, breaking the curd. If the latter splits cleanly, with a clear separation of whey, it is ready to be cut. Usually 30 minutes is required for coagulating. Cutting may be done with ordinary cheddar curd knives, preferably of the wire type; first, lengthwise of the vat with the horizontal knife, then crosswise and lengthwise with the vertical knife.

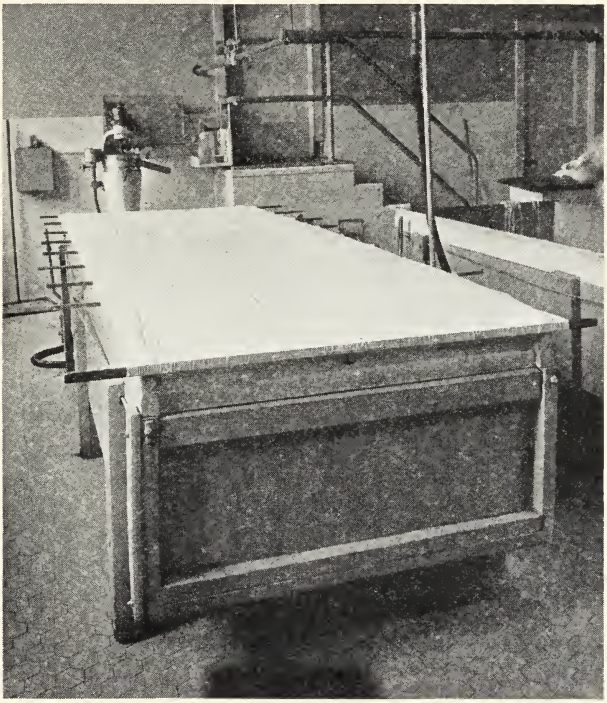


Fig. 3.—The vat covered by a cloth cover during the coagulation period.

Cooking the Curd.—Three to five minutes after cutting, the curd which sticks to the sides and bottom of the vat should be removed with a wooden paddle or with the hands, and the curd should be agitated very gently to prevent matting. Ten minutes after cutting, the steam or warm water should be turned into the jacket. The temperature should be raised 1° F during the first five minutes, and 1° or 2° F during the second five minutes of heating. The heating is continued until the cooking temperature of 98° to 105° F is reached during the following twenty minutes.

The curd is held at the cooking temperature until it has been properly firmed, the period required usually being one and one-quarter hours, depending upon the acidity, the percentage of butterfat in the milk, and the slowness of heating during the first ten minutes. During the heating and cooking periods, the curd should be agitated sufficiently to prevent the cubes from matting together. This will require almost constant agitation at first, but after the curd has been partially "firmed," less stirring is required. Agitation may be accomplished by using a curd rake, hand agitator, or power driven mechanical agitators.

Drawing the Whey (Dipping).—There are no accurate tests to determine the time when the whey should be drawn off, the process being known as 'dipping.' The cheese-maker must learn this from his experience and from the moisture tests of the cured cheese. The whey may be drawn when the curd has been 'firmed' enough, when there are few remaining 'soft centers,' and when it becomes slightly rubbery and springs apart if pressed between the hands. The acidity at dipping should not exceed 0.14 per cent. The time of dipping is also influenced by the time required for the whey to run from the vat. In the larger vats, dipping should begin earlier. The whey should be run through a whey separator in order to recover the lost butterfat, which usually amounts to from 0.20 to 0.30 per cent. A cheese factory cannot afford to operate without separating the whey.

Cooling the Curd.—While the whey is being drawn off and as soon as the curd appears above the top of it, the curd should be cooled to a temperature of about 86° F by running cold water into the jacket, and agitating gently in order to prevent matting. If the curd mats, it must be broken up by hand, a process which causes excessive losses of butterfat. After the temperature of 86° F is reached, the remaining whey is drawn off. Alternate trenching and mixing of the curd aid in draining off the last of the whey.

Many manufacturers run pure cold tap water into the vat on the curd as the last of the whey is drawn off. This water is then drawn off as soon as the desired temperature is reached. Although this method gives a very mild cheese, precaution must be taken not to soak the curd with water, thus obtaining a high moisture test.

Salting the Curd.—After the whey or water has been well drained off, about 20 to 30 minutes after the end of the dipping process, the curd is spread out over the bottom of the vat. Cheese salt is sprinkled over it, preferably in two applications, the curd and salt being thoroughly mixed after each addition. The amount of salt to use

varies from 2.5 to 3.5 pounds for each 1000 pounds of milk, depending upon the market requirements and the amount of salt lost during pressing. All salt should be completely dissolved while the curd is in the vat.

Placing the Curd in Cloths.—Cloths instead of metal hoops are used for molding Monterey cheese. They should be made of heavy muslin or sheeting and should be about 34 inches square. They should be washed and sterilized in boiling water each time before using. They are laid out evenly, one over the other, and are spread over the top of a large pail, metal bandager, or some other contrivance.

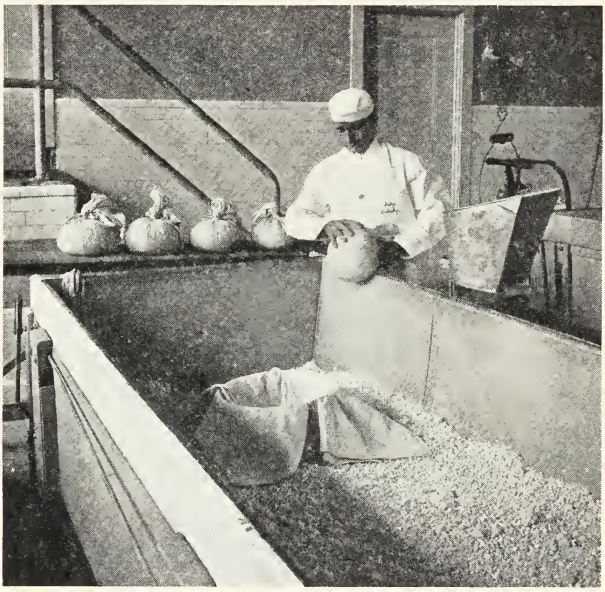


Fig. 4.—Molding the curd in cloths.

The centers of the cloths are pushed down and the edges left hanging over the sides. From 8 to 11 pounds of curd, enough to make a 6 or 9-pound cheese, is weighed or measured and poured into the top press cloth. The four corners are taken up, the whole cloth is straightened out, and the curd is formed as nearly round as possible. As the cloth is tightened, the curd within is given a rolling motion on the side of the vat or on a table and is pressed with the hand to expel as much of the whey as possible (fig. 4). The cloth is then tied tightly with a cloth string, and the excess cloth is spread out evenly over the top of the roll of curd in order that an even indentation will appear on the pressed cheese.

Pressing the Cheese.—Vertical presses, which should slope slightly in order to permit draining of the whey (fig. 5) are used. Too much pressure, however, may burst the cloths or press out too much moisture. Because presses do not give continuous pressure, a weight or railway-car spring may be placed directly under the pressure plate.

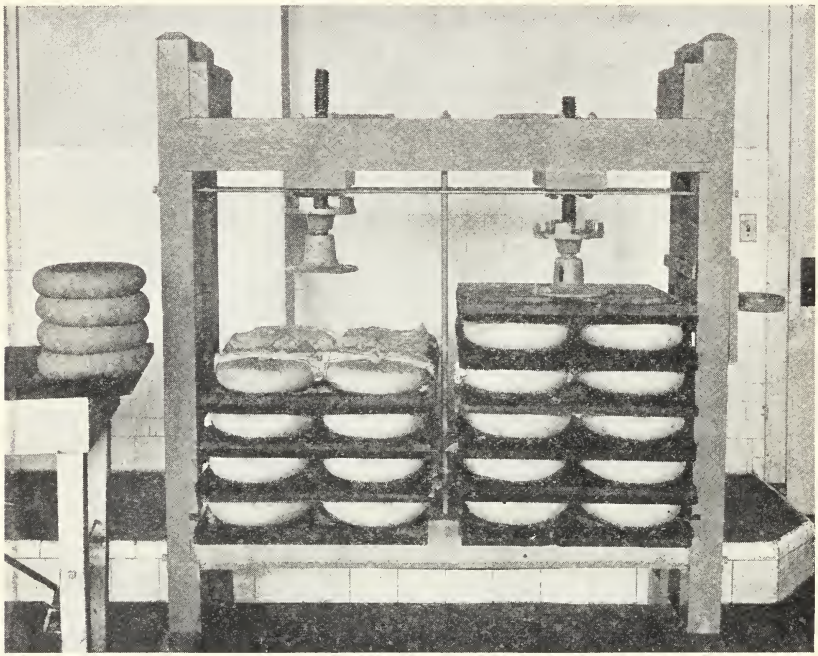


Fig. 5.—The cheeses in a vertical press.

In small factories or on the farm where there is small production, the cheeses may be pressed between heavy 12-inch boards with weights on top. They are left overnight and the cloths are removed the following morning. If the press cloths stick to the cheese, pulling out pieces of curd, it is likely that too much pressure was applied, or that the surfaces of the cheese became too dry during the pressing period. Less pressure, application of water to the cheese, or spraying water on the floors of the room will aid in preventing such a condition. Dirty cloths or cloths with too large mesh may also cause this difficulty.

Stenciling and Paraffining.—The cheese, upon being taken from the press, may be piled on trucks and transported to the drying room, the temperature of which should be between 60° F and 70° F. Within a few hours they will be dry enough to permit stenciling on the smooth side. The label required by the California Dairy Law indicates the

variety—whether whole-milk cheese, part-skim cheese, or skim cheese —and the license number of the factory (fig. 6). It is desirable to have also a date code for the information of the manufacturer, in case the cheeses should become mixed on the shelves or in case any should be returned. Code numbers are preferable to actual dates, as they help prevent difficulties in marketing. An example of a suitable code is given by the numbers 81571. The first figure "8" indicates the eighth month, the "15" the day of the month when the cheese was made, "7" the year 1927, and "1" the vat number. The cheese produced on the same day from vat numbers 2, 3, and 4, would be labeled similarly, except that the last number would be changed in each case.

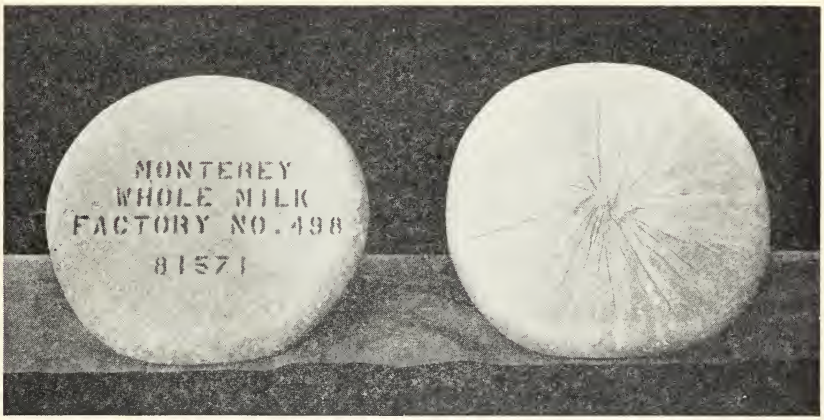


Fig. 6.—Cheese labeled on the smooth side according to the requirements of the California Dairy Laws; and the rough side of the cheese, showing indentations made by press cloth.

With this system, the cheese may always be compared with the corresponding cheese-making report (form 1), which shows the same serial number. The cheeses should be turned twice daily until the surface moisture has evaporated. From two to six days are usually required, according to the temperature and humidity of the drying room. They should then be dipped in hot paraffin at a temperature of from 220° F to 240° F for a period of from six to ten seconds. Care must be taken that the indentations on the cheese are completely covered with paraffin.

The paraffin prevents excessive loss of moisture, aids in preventing the growth of mold, mites, and skippers, and gives a neat, attractive appearance to the cheese. Some markets, however, prefer the unparaffined cheese. In this case, a thick, hard rind usually forms on the outside during the curing process.

The cheese is then placed on shelves in the curing room. Some factories use the same room for drying and curing, but this is not satisfactory as the drying room should have a lower humidity.

Curing the Cheese.—The curing room should have a temperature of about 60° F, and should be well ventilated. A moderate amount of moisture, about 70 per cent relative humidity, should be maintained. The shelves (fig. 7) should be constructed of wood, preferably of pine, and should be planed smoothly on both sides. They should be wider than the cheese and should be placed on the supports without fastening in order that they may be turned.

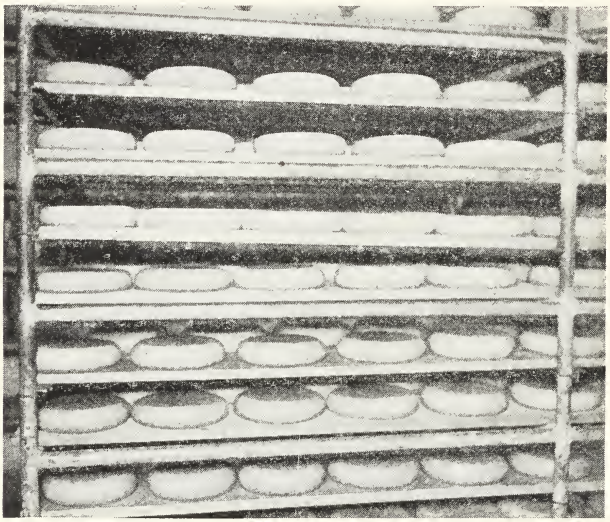


Fig. 7.—The cheeses on shelves in the curing room. Note that the shelves are merely laid on the supports.

The cheeses themselves should be turned every two or three days during the curing process and the shelves should be kept clean and dry. At intervals of one or two weeks, according to the tendency for mold growth, the tops of the shelves should be cleared and washed with a solution of formaldehyde. One-half pint of formalin to three gallons of water is a suitable strength, since the dilution is not injurious to the hands or eyes. Formalin may be purchased from any druggist or chemical supply house. After being so treated, the shelf boards should be turned and the cheese placed on the dry side. *Cheese should never be placed on wet shelves.* If the shelves become greasy and badly contaminated with mold, they should be removed

from the room and washed with hot water and alkali, rinsed, and dried in the sunlight, before the formaldehyde is applied.

The curing room should be kept free from cheese pests.[8]

Marketing the Cheese.—Monterey cheese is usually ready for the market after from three to six weeks of curing. Some manufacturers allow a shorter period for curing, but this practice is not recommended. The cheese is usually packed in boxes for shipping, although it is sometimes piled in large trucks and transported to the cities without packing. This is not advisable unless the roads are exceptionally smooth.

Though the greater part of Monterey cheese manufactured in California is marketed in the larger cities, it is gaining in popularity in the smaller towns. The market quotations are printed in the daily newspapers and are now being given over the radio.

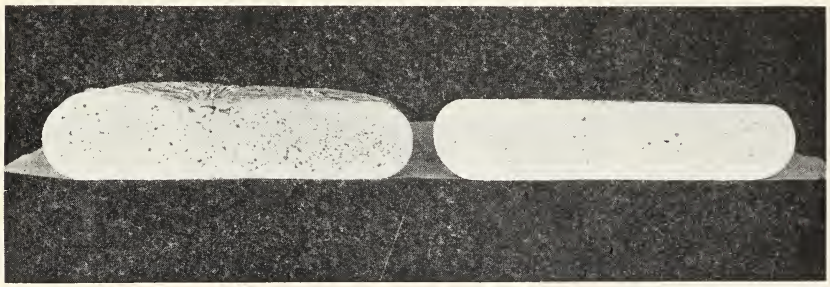


Fig. 8.—Left, a gassy cheese; right, the ideal porous body.

While the market requirements for Monterey cheese vary in the different cities, all usually specify that the cheese hold its shape, and have a soft mellow texture and a porous body, the latter resulting from the natural process of manufacture and not from gas formation in the cheese (fig. 8).

Keeping Make-Sheet Records.—A record sheet giving a permanent record of amounts and methods should be filled out for each vat of cheese manufactured. Such a record is helpful in locating difficulties in case of returned cheese and affords a basis from which a report of the total yearly production in the factory, as required by the California Dairy Law, can be calculated. An example of a suitable record is given in form 1.

[8] deOng, E. R., and C. L. Roadhouse. Cheese pests and their control. California Agr. Exp. Sta. Bul. 343:408–422. 1922.

FORM 1

MONTEREY CHEESE MAKING REPORT

Date ..... Serial No. .....

Amount of milk ..... Number washings ..... Acid .....

Condition ..... Temp..... Time salted ..... Acid .....

Temp. of pasteurization ..... Amount of salt..... Acid .....

Per cent of fat ..... Acid ..... Time pressed .....

Amount of starter..... Rate ..... Time setting to pressing .....

Amount of rennet ..... Rate ..... Brand .....

Temp. when added..... Acid ..... Number made .....

Time set ..... Weight of green cheese .....

Time cut ..... Acid ..... Weight of cured cheese .....

Time in coagulating ..... Amount cheese 1 lb. fat .....

Time steam applied ..... Amount cheese 100 lbs. milk .....

Time raising temp. ..... Per cent moisture .....

Temp. cooked ..... Per cent butterfat .....

Time dipped ..... Acid ..... Per cent butterfat in dry matter .....

Per cent fat in whey .....

Remarks: .....

.....

Cheese maker .....

PART-SKIM AND SKIM MONTEREY CHEESE

The California Dairy Law defines part-skim cheese as that "containing not less than 30 per cent of pure milk fat in its water-free substance." Skim cheese is that "containing less than 30 per cent pure milk fat in its water-free substance."

In the manufacture of part-skim and skim cheese the milk is standardized lower than for whole-milk Monterey. The process of manufacture of these types of cheese is similar to that used for whole-milk Monterey except that lower temperatures of cooking are required in the firming of the curd.

NON-STANDARD JACK CHEESE

The name 'Non-standard Jack' has been given to the Monterey cheese when it contains more than 42 per cent of moisture. There appears to be a demand in some markets for this soft, high-moisture cheese. The California Dairy Law does not define Non-standard Jack cheese, but classifies it as a special variety which may be manufactured and sold under a written permit issued by the California State Depart of Agriculture. The standards of composition for Non-standard Jack cheese are the same as for Monterey in regard to fat, and the maximum moisture content may be regulated by California State Department of Agriculture.

This special type must be labeled 'Non-standard Jack cheese' and the date of manufacture must appear on the cheese. It must be sold to the consumer within three weeks of the date of manufacture, since the high percentage of moisture injures the keeping qualities.

The process of manufacture of Non-standard Jack cheese is similar to that for Monterey except that the curd is dipped while in a very soft condition, thus leaving an excessive amount of moisture in the cheese.

SUMMARY OF THE STEPS IN THE PROCESS OF MANUFACTURE OF WHOLE-MILK MONTEREY CHEESE

1. Pasteurize the milk.
2. Take acidity test (should not be over 0.18 per cent).
3. Take sample of milk for butterfat test.
4. Standardize if desirable.
5. Add ½ to 1 per cent starter.
6. Heat milk to 88° F.
7. Measure rennet, 4 to 6 ounces for each 1000 pounds of milk, dilute it by adding cold water, and add it to milk.
8. Agitate thoroughly, draw milk from gate-valve and pour back, and quiet the milk.
9. Cover the vat with canvas or cloth.
10. Cut curd when firm. Use the horizontal knife lengthwise, the vertical knife crosswise and lengthwise.
11. Three to five minutes after cutting, begin to stir the curd.

12. Ten minutes after cutting, begin heating. Raise the temperature 1° F in the first five minutes and 1° or 2° F during the second five minutes. It should reach 98° to 105° F during the next twenty minutes.
13. Agitate sufficiently to prevent matting from time of cutting until the curd is dipped.
14. Draw the whey when the curd is firm.
15. Cool the curd to 86° F by running cold water into the jacket or by running pure cold tap water on the curd in the vat.
16. After the curd has drained, add 2.5 to 3.5 pounds of salt for each 1000 pounds of milk.
17. After the salt has dissolved, weigh or measure into press cloths, roll, and tie with cloth strings.
18. Place cheese in the press, and press during the night.
19. Remove from press, take off cloths, transport to drying room.
20. Stencil when the smooth surface is dry.
21. After from two to six days, dip in paraffin at 220° to 240° F for six to ten seconds, and place in curing room.

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